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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,179	10/28/2003	Steven E. Curtis	135796	4289

7590   04/19/2005

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EXAMINER
MILLER, PATRICK L

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

AK

	Application No.	Applicant(s)
Office Action Summary	10/695,179	CURTIS, STEVEN E.
	Examiner	Art Unit	
	Patrick Miller	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2004*.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
    closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,7,12 and 19-35* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,7,12 and 19-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
    application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date *02042005*.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 12/21/04 have been fully considered but they are not persuasive.

    -   With respect to the rejection of claim 19 under 35 USC 112 (2nd), the "minor"

        amendments do not rectify the 112 (2nd) rejection. See rejection below.

Claim Objections

2. Claim 4 is objected to because of the following informalities: see bullet(s) below.

    Appropriate correction is required.

    -   Claim 4 recites, "said optimizing transfer function." Lack of antecedent basis for this

        term.

    -   Claim 4 does not define the variables y_0 and x_2.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4, 19-21, and 24 are rejected under 35 U.S.C. 112, second paragraph, as being

    indefinite for failing to particularly point out and distinctly claim the subject matter which

    applicant regards as the invention.

    -   With respect to claim 19, this claim is unclear. First, this claim does not disclose the

        steps of a method that set an initial aggressiveness level for responding to a collision and

        a desired aggressive level for responding to an input control signal. More specifically, it

        is unclear how this claim can say that the servo system has an <u>initial</u> aggressiveness level

        for responding to a collision (preamble), but then reduces the <u>initial</u> aggressiveness level

to respond to the collision. I.e., which aggressiveness level corresponds to a collision, the

initial level or the reduced level? Additionally, the following wording is unclear:

"maintaining the desired aggressiveness level for responding to the input."

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 19-21, and 24, as best understood by the Examiner, are rejected under 35

U.S.C. 102(e) as being anticipated by Tomita (6,784,632).

- With respect to claim 19, Tomita discloses a method of operating a servo system, wherein

    said method comprises: reducing the initial aggressiveness (response) level when

    responding to a collision (disturbance) (Fig. 11, when Td is present, i.e., when a

    disturbance is present, the aggressiveness (response) level is lowered (see also Fig. 7)

    based on the denominator of the "box" between Td and theta2 (cols. 17/18, ll. 43-67/1-5);

    and maintaining the desired aggressiveness (response) level when responding a

    disturbance is not detected (Fig. 11, when Td = 0, i.e., no collision/disturbance, no

    reduction in aggressiveness/response).

- With respect to claim 20, the system includes a feedback system (Fig. Fedback term, θ),

    and reducing the initial aggressiveness level comprises optimizing the feedback system

    for collisions (cols. 17/18, lines 43-67/1-5).

- With respect to claim 21, maintaining the desired aggressiveness comprises providing a

   feed forward term (Fig. 11, #10).

- With respect to claim 24, Tomita disclose injecting the feed forward term into a plurality

   of points (Fig. 1, derivative of velocity is acceleration, etc.).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

5.   Claims 1, 22, 23, and 25-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over

   Yim (5,723,965) in view of Arita et al. (5,440,213).

- With respect to claims 1 and 26, Yim discloses a method and apparatus for controlling a

   servo system, where the servo system has an electromechanical system having a

   mechanical output controlled by the servo system (col. 1, ll. 6-13), and wherein said

   method comprises inputting a forcing function to the servo system (Fig. 1, ωd*);

   generating a difference signal at a monitoring point M representing a difference between

   the forcing function and a feedback signal (Fig. 1, T1); injecting a feed forward signal,

   where the feed forward term is dependent upon the forcing function (Fig. 1, signal

   through #4), and processing the difference signal (Fig. 1, #s 14 and 16 process signal T1).

- Yim does not explicitly disclose processing the difference signal to detect a collision.

- Arita et al. disclose comparing a disturbance signal to a threshold value (Fig. 4, 103), and

   if the disturbance signal is greater than the threshold value, this indicates a collision (Fig.

4, if yes at step 103, #104 indicates collision). The motivation to detect a collision as

described above it to stop the motor when a collision is detected, which protects the

motor from damage.

- Therefore, it would have been obvious to one having ordinary skill in the art at the time

  of the invention that the subtractor of Yim (Fig. 1, #16) determines whether a collision

  has occurred based on the teachings of Arita et al. More specifically, if the error signal

  from the subtractor of Yim (Fig. 1, #16) is above a threshold, this indicates that a

  collision has occurred, thereby providing the advantage of allowing the motor to be

  stopped, which prevents the motor from damage, as taught by Arita et al.

- With respect to claims 22 and 27, Yim discloses optimizing a transfer function

  output/load function (col. 3, lines 25-29).

- With respect to claims 23 and 28, Yim discloses the feed forward signal dependent upon

  the forcing function is selected to also optimize a transfer function output/forcing signal

  (Fig. 1, #4 injects a feed forward term, T2 based on the force function, ωd^*; cols. ¾, lines

  21-35/36-42).

- With respect to claim 25, Arita et al disclose initiating a command to stop movement

  when a collision is detected (Fig. 4, #105).

- With respect to claim 29, Yim discloses optimizing the output/load function without

  using the feed forward loop (col. 3, lines 25-29).

6. Claims 1, 25, 26, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over

   Rehm et al. (2005/0057205) in view of Arita et al. (5,440,213).

- With respect to claim 1, Rehm et al. disclose a method comprising: inputting a forcing function to the servo system to direct the mechanical output (Fig. 5, ω*); generating a difference signal at a monitoring point representing a difference between the forcing function and a feedback signal (Fig. 5, output of #14 at point between #24 and #27 because kp is merely a proportional gain and only changes the magnitude of the error signal); and injecting a feed forward signal into the servo system, where the feed forward term is dependent upon the forcing function and increases a detection threshold for collision stimulus at the monitoring point (Fig. 5, feed forward through units #16 and #50, and added at #27, which increases the Tm and thus, Td); and processing the difference signal (Fig. 5, output of #30).

- With respect to claim 26, disclose an apparatus comprising: a servo system ([0005]); an electromechanical system having a mechanical output controlled by the servo system ([0005]); the servo system configured to input a forcing function to direct movement (Fig. 5, ω*); the system generates a difference signal at a monitoring point representing a difference between the forcing function and a feedback signal (Fig. 5, output of #14 at point between #24 and #27 because kp is merely a proportional gain and only changes the magnitude of the error signal); and the system injects a feed forward signal, where the feed forward signal is dependent upon the forcing function and effective to increase a detection threshold for collision stimulus at the monitoring point (Fig. 5, feed forward through units #16 and #50, and added at #27, which increases the Tm and thus, Td); and the apparatus further configured to process the difference signal (Fig. 5, output of #30).

- Rehm et al. do not explicitly disclose processing the difference signal to detect a collision.

- Arita et al. disclose comparing a disturbance signal to a threshold value (Fig. 4, 103), and if the disturbance signal is greater than the threshold value, this indicates a collision (Fig. 4, if yes at step 103, #104 indicates collision). The motivation to detect a collision as described above it to stop the motor when a collision is detected, which protects the motor from damage.

- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the subtractor of Rehm et al. (Fig. 5, #30) determines whether a collision has occurred based on the teachings of Arita et al. More specifically, if the error signal from the subtractor of Rehm et al (Fig. 5, #30) is above a threshold, this indicates that a collision has occurred, thereby providing the advantage of allowing the motor to be stopped, which prevents the motor from damage, as taught by Arita et al.

- With respect to claims 25 and 31, Arita et al disclose initiating a command to stop movement when a collision is detected (Fig. 4, #105).

7. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rehm et al. (2005/0057205) and Arita et al. (5,440,213) as applied to claim 26 above, and further in view of Tomita (6,784,632).

- Rehm et al. and Arita et al. do not disclose injecting the feed forward signal into a plurality of points in the servo system.

- Tomita teaches feeding forward an input signal and injecting said input signal into a plurality of points in a servo system (Fig. 1). The motivation inject an input signal at a

plurality of points is to control the servo based on derivative values of an input signal

(derivative of velocity is acceleration, etc.), which allows for greater control.

- Therefore, it would have been obvious to one having ordinary skill in the art at the time

   of the invention to inject the feed forward input of Rehm et al. and Arita et al. at a

   plurality of points, thereby providing the advantage of allowing the servo to be controlled

   by the derivatives of the input signal, which allows for greater servo control, as taught by

   Tomita.

8. Claims 7 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rehm et al.

   (2005/0057205) in view of Arita et al. (5,440,213) and Hazelton et al. (2001/0000974).

- With respect to claim 7, Rehm et al. disclose a system comprising: a servo system

   configured to position a device ([0005]); an input forcing function to direct at least one of

   the device (Fig. 5, ω^*); the system generates a difference signal at a monitoring point

   representing a difference between the forcing function and a feedback signal (Fig. 5,

   between #24 and #27, where the output of #24 is still the difference signal of #14, just

   proportionally modified); injecting a feed forward signal, where the feed forward signal

   is dependent upon the forcing function and effective to increase a detection threshold for

   collision stimulus at the monitoring point (Fig. 5, feed forward through units #16 and

   #50, and added at #27, which increases the Tm and thus, Td); and the system processes

   the difference signal (Fig. 5, output of #30).

- Rehm et al. do not disclose processing the difference signal to detect a collision, and a

   radiation source and radiation detector.

- Arita et al. disclose comparing a disturbance signal to a threshold value (Fig. 4, 103), and if the disturbance signal is greater than the threshold value, this indicates a collision (Fig. 4, if yes at step 103, #104 indicates collision). The motivation to detect a collision as described above it to stop the motor when a collision is detected, which protects the motor from damage.

- Hazelton et al. disclose a servo system that controls an imaging system with a radiation source and radiation detector (Fig. 1), and a servo system positions the object to be scanned (Fig. 1, #15 controls #14). The motivation to use a servo system with an imaging system as described above is to control the system using various known motor control techniques, which provides the advantages accompanied by the particular control technique.

- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the subtractor of Rehm et al. (Fig. 5, #30) determines whether a collision has occurred based on the teachings of Arita et al. More specifically, if the error signal from the subtractor of Rehm et al (Fig. 5, #30) is above a threshold, this indicates that a collision has occurred, thereby providing the advantage of allowing the motor to be stopped, which prevents the motor from damage, as taught by Arita et al. Furthermore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the servo control system of Rehm et al. could be used to control an imaging system, thereby providing the advantage of controlling the system with the benefits provided by the Rehm et al. controller, as taught by Hazelton et al.

- With respect to claim 35, Arita et al disclose initiating a command to stop movement when a collision is detected (Fig. 4, #105).

9. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rehm et al. (2005/0057205), Arita et al. (5,440,213), and Hazelton et al. (2001/0000974) as applied to claim 7 above, and further in view of Tomita (6,784,632).

- Rehm et al., Arita et al., and Hazelton et al. do not disclose injecting the feed forward signal into a plurality of points in the servo system.

- Tomita teaches feeding forward an input signal and injecting said input signal into a plurality of points in a servo system (Fig. 1). The motivation inject an input signal at a plurality of points is to control the servo based on derivative values of an input signal (derivative of velocity is acceleration, etc.), which allows for greater control.

- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to inject the feed forward input of Rehm et al., Arita et al., and Hazelton et al. at a plurality of points, thereby providing the advantage of allowing the servo to be controlled by the derivatives of the input signal, which allows for greater servo control, as taught by Tomita.

10. Claims 7, 12, 32, 33, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yim (5,723,965) in view of Arita et al. (5,440,213) and Hazelton et al. (2001/0000974).

- With respect to claim 7, Yim discloses a system comprising: a servo system configured to position a device (col. 1, ll. 6-13); an input forcing function to direct at least one of the device (Fig. 1, ωd*); the system generates a difference signal at a monitoring point representing a difference between the forcing function and a feedback signal (Fig. 1, T1);

injecting a feed forward signal, where the feed forward signal is dependent upon the

forcing function (Fig. 1, signal through #4); and the system processes the difference

signal (Fig. 1, #s 14 and 16 process T1).

- Yim does not disclose processing the difference signal to detect a collision, and a

  radiation source and radiation detector.

- Arita et al. disclose comparing a disturbance signal to a threshold value (Fig. 4, 103), and

  if the disturbance signal is greater than the threshold value, this indicates a collision (Fig.

  4, if yes at step 103, #104 indicates collision). The motivation to detect a collision as

  described above it to stop the motor when a collision is detected, which protects the

  motor from damage.

- Hazelton et al. disclose a servo system that controls an imaging system with a radiation

  source and radiation detector (Fig. 1), and a servo system positions the object to be

  scanned (Fig. 1, #15 controls #14). The motivation to use a servo system with an

  imaging system as described above is to control the system using various known motor

  control techniques, which provides the advantages accompanied by the particular control

  technique.

- Therefore, it would have been obvious to one having ordinary skill in the art at the time

  of the invention that the subtractor of Yim (Fig. 1, #16) determines whether a collision

  has occurred based on the teachings of Arita et al. More specifically, if the error signal

  from the subtractor of Yim (Fig. 1, #16) is above a threshold, this indicates that a

  collision has occurred, thereby providing the advantage of allowing the motor to be

  stopped, which prevents the motor from damage, as taught by Arita et al. Furthermore, it

would have been obvious to one having ordinary skill in the art at the time of the

invention that the servo control system of Yim could be used to control an imaging

system, thereby providing the advantage of controlling the system with the benefits

provided by the Yim controller, as taught by Hazelton et al.

- With respect to claim 32, Yim disclose optimizing the transfer function output/load

  function (col. 3, lines 25-29).

- With respect to claim 12, Yim discloses optimizing output/load function without the

  influence of the feed forward signal (col. 3, lines 25-29).

- With respect to claim 33, Yim discloses the feed forward signal dependent upon the

  forcing function is selected to optimize the transfer function output/input (Fig. 1, #4

  injects a feed forward term, T2 based on the force function, ωd^*; cols. ¾, lines 21-35/36-

  42).

- With respect to claim 35, Arita et al disclose initiating a command to stop movement

  when a collision is detected (Fig. 4, #105).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this
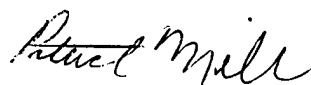
final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Patrick Miller whose telephone number is 571-272-2070. The

examiner can normally be reached on M-F, 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, David Martin can be reached on 571-272-2800 ext 41. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9318.
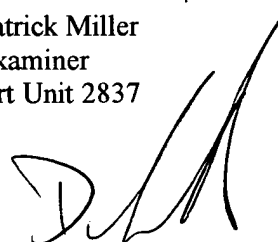
Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is 703-306-3431.

Information regarding the status of an application may be obtained from the Patent Application

Information Retrieval (PAIR) system. Status information for published applications may be obtained

from either Private PAIR or Public PAIR. Status information for unpublished applications is available

through Private PAIR only. For more information about the PAIR system, see http://pair-

direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Patrick Miller
Examiner
Art Unit 2837

pm
April 4, 2005

DAVID MARTIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800